

**REMARKS**

If the Examiner believes that there are any unresolved issues in any of the claims now pending in the application, the Examiner is urged to telephone George Wolken, Jr., Esq. at (408) 567-0340 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

The preamble to claims 1, 2, 4-8, 10, 11 have been modified to reflect that the workpiece materials are not limited to plastics, as described in paragraph [0030] and elsewhere in the specification.

New claims 22 and 23 have been added for the specific fabrication of microfluidic devices employing polymerization welding, as described in the specification beginning in paragraph [0037]. As Applicants respectfully contend and support in the following arguments, independent claims 1 and 7 for joining by polymerization welding are patentable, rendering fabrication of microfluidic devices by these techniques also patentable in claims 22 and 23.

A. Claim Rejections - 35 U.S.C. § 112

A.1. The Examiner objects to claims 1 and 7 under 35 U.S.C. § 112 (2nd paragraph) for failing to particularly point out and distinctly claim the subject matter regarded as the invention. More particularly, the Examiner argues that a "surface diffusion zone adjacent to a surface" of a workpiece is ambiguous in not specifying whether the surface diffusion zone relates to the interior of the workpiece or

lies on the surface but external to the workpiece. Applicants have amended paragraph [0031] of the specification, and also claims 1 and 7, to more clearly specify that the surface diffusion zone lies on the interior of the workpiece. This is clearly depicted in FIG. 1C and FIG. 2C, paragraph [0035], and is implicit in the normal usage of "diffusion zone" in the art.

A.2. Applicants have also added "...at or near..." and "...surface or..." to the last sentence of paragraph [0031] to resolve other possible misinterpretations of the subject matter described therein and to make paragraph [0031] more clearly consistent with other portions of the specification. "...surface or..." indicates that a surface diffusion zone need not be present in both workpieces to be joined, as described in several places in the specification, including paragraphs [0043], [0044], FIG. 5 and Example 4 at paragraph [0062]. "...at or..." indicates that the surface diffusion zone is not required to have any gap or spacing between the polymerizable material and the surface of the workpiece. This change to [0031] is consistent with the location of the surface diffusion zone as described, for example, in paragraph [0040].

A.3. The Examiner objects to claims 2 and 8 under 35 U.S.C. § 112 (2nd paragraph) for failing to particularly point out and distinctly claim the subject matter regarded as the invention. More particularly, the Examiner argues that "microfeature" is unclear as to its limiting effect. Thus, Applicants have amended paragraph [0033] to indicate that "microfeature" as used herein indicates structure on the surface of the workpiece having a role to play in the

intended function of the device. Some examples are given of fluid-carrying structures for microfluidic applications, and holograms. The microstructures thus defined need not be direct participants in the basic function of the device (as fluid carriers in a microfluidic device), but structures for increasing the strength, reliability, maintainability, and numerous other beneficial ends are also included. In brief, "microfeature" is used herein to exclude structures fortuitously occurring on the surface of a workpiece having no role to play in the workpiece's desired function.

A.4. The Examiner objects to claims 3 and 9 under 35 U.S.C. § 112 (2nd paragraph) for failing to particularly point out and distinctly claim the subject matter regarded as the invention. More particularly, the Examiner argues that "high-performance engineered plastic" is unclear as to its limiting effect. Claims 3 and 9 are canceled and claims 4 and 10 modified to include additional species of high-performance engineered plastic polyimides and polyetherketones. Polyimides as a species of high-performance engineered plastic is described in [0006]. Polyetherketones as a species of high-performance engineered plastic is described in [0053].

B. Claim Rejections - 35 U.S.C. § 102

B.1. The Examiner has rejected claims 1-3 and 7-9 under 35 U.S.C. § 102 (b) as being anticipated by Unger et al (US Patent Application Publication 2001/0054778; published Dec. 27, 2001; hereinafter "Unger"). In light of the current amendments to claims 1 and 7, and/or the

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following arguments, this rejection is respectfully traversed.

Applicants call attention to MPEP § 2143.04 which states in part:

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art...."All words in a claim must be considered in judging the patentability of that claim against the prior art."... When evaluating claims for obviousness under 35 U.S.C. 103, all the limitations of the claims must be considered and given weight..." (citations omitted and emphasis supplied).

While MPEP § 2143.03 strictly relates to obviousness determinations under 35 U.S.C. § 103, Applicants respectfully submit that no lesser standard applies to a determination of anticipation under 35 U.S.C. 102. Applicants further submit that at least one element of claims 1 and 7 is not taught or suggested by Unger, in particular the claim element of creating a surface diffusion zone of polymerizable material in one or both workpieces to be joined.

Unger describes several bonding techniques in paragraph [0141]: heterogeneous bonding, homogenous bonding, gluing by an adhesive, heating to bond thermoset elastomers, and also plasma treatment of elastomer surfaces in [0147]. The bonding techniques described by Unger utilizing heating and surface plasma treatment of the workpieces to be bound clearly lack the element of the present claims 1 and 7 of creating a surface diffusion zone of polymerizable material within the workpiece.

The other techniques of Unger relate to the formation of chemical bonding between adjacent surfaces of workpieces, either due the reaction of species already present in one or more of the workpieces, or with the addition of an adhesive layer between the workpieces leading to bonding. In no case does Unger describe the "creation of a surface diffusion zone" as that element is used in both claims 1 and 7. Even assuming *arguendo* that a reasonable equivalent of a "surface diffusion zone" may occur in one or more of Unger's workpieces to be joined (which Applicants do not concede), this is insufficient to render Unger anticipating prior art.

Although the Doctrine of Inherency (MPEP § 2112) states that, "The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims...", Applicants respectfully submit that MPEP § 2112 (IV) clearly renders Unger ineffective as anticipating prior art, stating: "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." (emphasis in MPEP). Also in MPEP § 2112 (IV), citing , *In re Oelrich* 666 F.2d 578, 212 USPQ 323, "...[to reject claims on the basis of inherency] the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and that it would have been so recognized by persons of ordinary skill in the art." (emphasis supplied) And citing *In re Robertson* 169 F.3d 743, 49 USPQ2d 1949, "the mere fact that a certain thing may result from a given set of circumstances is not sufficient." (emphasis supplied) Thus, even if a surface diffusion zone

fortuitously occurs in one or more of the Unger samples, that is insufficient to render the present claims 1 and 7 unpatentable.

In addition, claims 1 and 7 are amended to include the optional step of removing excess polymerizable material from the surface (or surfaces) of the workpiece (or workpieces) for those cases in which excess polymerizable material remains on the surface after creation of the adjacent surface diffusion zone(s). That is, excess polymerizable may not be present on the surface, but if it is, it is removed as described (for example) in paragraph [0036]. This further distinguishes the present invention from those bonding techniques of Unger in which an adhesive layer occurs between the bonded surfaces.

MPEP § 2143.03 states in part "...If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious (citations omitted)" Applicants respectfully submit that the same reasoning applies such that novelty of an independent claim under 35 U.S.C. 102 leads to a conclusion of novelty for all claims depending therefrom. Thus, novelty of claims 1 and 7 as demonstrated above leads to the novelty of all claims depending therefrom, including claims 2, 4-8, 10 and 11.

B.2. The Examiner has rejected claims 1-3 and 7-9 under 35 U.S.C. § 102 (b) as being anticipated by Soane et al (US Patent 6,176,962; issued Jan. 23, 2001; hereinafter "Soane"). In light of the current amendments to claims 1 and 7, and/or the following arguments, this rejection is respectfully traversed.

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Applicants call attention to MPEP § 2143.04 which states in part:

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art...."All words in a claim must be considered in judging the patentability of that claim against the prior art."... When evaluating claims for obviousness under 35 U.S.C. 103, all the limitations of the claims must be considered and given weight..." (citations omitted and emphasis supplied).

While MPEP § 2143.03 strictly relates to obviousness determinations under 35 U.S.C. § 103, Applicants respectfully submit that no lesser standard applies to a determination of anticipation under 35 U.S.C. 102. Applicants further submit that at least one element of claims 1 and 7 is not taught or suggested by Soane, in particular the claim element of creating a surface diffusion zone of polymerizable material in one or both workpieces to be joined without a layer of excess polymerizable material.

Soane teaches away from the present invention in that, either thermal bonding is employed, or a distinct layer of adhesive is present in Soane's bonding techniques, as clearly depicted in FIG. 5 and 6 as element 16 and described in detail in Soane col. 5, lines 33-64. In addition, as Soane states explicitly:

"Where a bonding material is used, a thin film or layer of bonding material at the interface results." Col. 3, lines 50-53.

"For example, a base plate and cover plate constructed of a plastic material can be bonded together directly (for

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example by thermal bonding) or by use of an adhesive layer." Col. 5, lines 21-24.

"Some care must be taken to apply the bonding material as a layer or film that is sufficiently thick and uniform to ensure that a continuous strong bond can form between the cover and the base plate...." Col. 6, lines 18-21.

Applicants respectfully submit that the absence of such a layer is an important advantage of the present invention as discussed, for example, in paragraph [0033] of the present application. Thus, Applicants further submit that the claims as amended are patentably distinct from Soane pursuant to MPEP § 2143.03 cited above.

MPEP § 2143.03 states in part "...If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious (citations omitted)" Applicants respectfully submit that the same reasoning applies such that novelty of an independent claim under 35 U.S.C. 102 leads to a conclusion of novelty for all claims depending therefrom. Thus, novelty of claims 1 and 7 as demonstrated above leads to the novelty of all claims depending therefrom, including claims 2,3,8 and 9.

C. Claim Rejections - 35 U.S.C. § 103

C.1. The Examiner has rejected claims 4-6, 10 and 11 under 35 U.S.C. § 103 (a) as being unpatentable over Soane et al (US Patent 6,176,962; issued Jan. 23, 2001; hereinafter "Soane") as applied to claims 1-3 and 7-9 above and further in view of Kawazoe et al (WO 03/070623, published Aug. 28, 2003, "Kawazoe"), and/or Stokich et al (U.S. Patent 6,184,284 issued Feb. 6, 2001, "Stokich"),



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and/or White et al (U.S. Patent 4,824,500 issued Apr. 25, 1989, "White").

Applicants respectfully traverse this rejection on the grounds that none of the cited references teach or suggest, singly or in combination, the bonding of workpiece surfaces by the polymerization welding of the present invention; that is, workpiece bonding arising from one or more polymerizable materials in one or more surface diffusion zones and in the absence of excess polymerizable material on the surface to be bonded. The detailed discussion is presented in section B.2. above in connection with a more thorough elucidation of the distinctions with the Soane reference and is not repeated here. Applicants respectfully submit that none of the cited references supply this missing claim element, singly or in combination, so pursuant to the "all elements rule" of MPEP § 2143.03, the present claims are patentable.

C.2. The Examiner has rejected claims 4-6, 10 and 11 under 35 U.S.C. § 103 (a) as being unpatentable over Unger et al (US Patent Application Publication 2001/0054778; published Dec. 27, 2001; hereinafter "Unger") as applied to claims 1-3 and 7-9 above and further in view of Kawazoe et al (WO 03/070623, published Aug. 28, 2003, "Kawazoe"), and/or Stokich et al (U.S. Patent 6,184,284 issued Feb. 6, 2001, "Stokich"), and/or White et al (U.S. Patent 4,824,500 issued Apr. 25, 1989, "White").

Applicants respectfully traverse this rejection on the grounds that none of the cited references teach or suggest, singly or in combination, the bonding of workpiece

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#### CONCLUSION

In view of the above amendments and arguments, the Applicants respectfully submit that all claims currently pending in this application, claims 1, 2, 3-8, 10, 11, 22 and 23, are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,

February 16, 2007

  
Peter L. Michaelson, Attorney  
Reg. No. 30,090  
Customer No. 54,520  
(732) 542-7800

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Reply to Office Action of Oct. 7, 2006



MICHAELSON & ASSOCIATES  
Counselors at Law  
P.O. Box 8489  
Red Bank, New Jersey 07701

**CERTIFICATE OF MAILING under 37 C.F.R. 1.8(a)**

I hereby certify that this correspondence is being deposited on **February 16, 2007** with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



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Reg. No.

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